REMARKS

Applicant thanks the Examiner for the indication of allowable subject matter with respect to Claims 2 and 4 in the instant application. Applicant has reviewed the outstanding Office Action and rejection based on the *Suzuki* reference, United States Patent No. 6,515,703. Applicant has modified claims 1, 3, and 5.

Accordingly, Applicant submits that Claims 2 and 4 remain in condition for allowance, and Applicant submits that all of the remaining claims in the application also are now in condition for allowance. Through this amendment, Applicant has modified independent claims 1, 3 and 5 to further require that during the vertical transfer operation, there is a transfer of charge in the vertical direction. Suzuki is a much different device and provides no such transfer. The *Suzuki* reference is directed to a much different transfer method and employs a tri-state signal protocol, and the specific signal arrangement described therein only incidentally falls within the scope of independent claims 1, 3, and 5 prior to the present amendment. Actually, neither *Suzuki* nor any other reference of record provides any teaching or suggestion whatsoever regarding Applicants new and improved signal transferring method that is described in accordance with the present invention.

As noted in Applicants specification beginning on page 2, when the transfer speed in the vertical charge transfer portion is increased, the period for time of accumulating the charge in the vertical transfer portion is reduced and the quantity of charge handled in the vertical transfer portion is decreased. As a result, there is a concern that the transfer

efficiency is reduced. In particular, for electronic sensors there is a tendency that an increase in the number of pixels is also demanded in order to realize a higher image resolution for both moving and still pictures. It is therefore necessary to take into account these demands, and accordingly it is necessary to find an effective technique which will suppress the negative effects associated with the decrease in the handling charge quantity in the vertical charge transfer portion of an imaging device.

Applicants innovation has overcome these deficiencies by describing an innovative charge transfer technique which suppresses the negative effects associated with the decrease in the handling quantity of electric charges when transferring signal charges at high speed in the vertical charge transfer portions. In accordance with the systems and methods described in the present invention, high logic level driving pulses are selectively applied to the transfer electrodes in respective sectional period in a vertical charge transfer, and wherein the sectional period in the vertical charge transfer period in which the number of transfer electrodes to be applied with a high logic level driving pulses is minimum is set to be longer than that of other sectional periods. As a result, a dramatic improvement in the charge handling is provided.

Neither *Suzuki* nor any other reference of record provides teaching or suggestion regarding this advance in the art. More specifically, the *Suzuki* reference is merely directed to an image pick-up device that includes a plurality of photoelectric conversion cells in a charge transfer device including charge transfer cells wherein the number of charge transfer cells is greater than the number of photoelectric conversion cells. As noted above, *Suzuki*

teaches a tri-state signal transfer protocol, but there is no teaching or suggestion regarding the relationship of the signals as described and claimed in the instant application.

Applicant also notes that Figure 15 of Suzuki illustrates a system where the period t_1 to t_2 is not the vertical transfer operation. The vertical transfer operation actually does not begin until the period t_4. Applicant submits that the modification of the claims set forth herein clearly overcomes the rejection.

Accordingly, in light of the foregoing, Applicant respectfully submits that all claims now stand in condition for allowance.

Respectfully submitted,

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